

### Related Occupations

Mechanics and repairers who work on other types of mobile equipment powered by internal combustion engines include automotive mechanics and service technicians, diesel mechanics and service technicians, farm equipment mechanics, and mobile heavy equipment mechanics.

### Sources of Additional Information

For more details about work opportunities, contact local motorcycle, boat, and lawn and garden equipment dealers, and boat yards and marinas. Local offices of the State employment service may also have information about employment and training opportunities.

General information about motorcycle mechanic careers may be obtained from:

☛ Motorcycle Mechanics Institute, 2844 West Deer Valley Rd., Phoenix, AZ 85027.

☛ American Motorcycle Institute, 3042 West International Speedway Blvd., Daytona Beach, FL 32124. Telephone (toll free): 1-800-874-0645.

General information about boat mechanic careers is available from:

☛ Marine Mechanics Institute, 2844 West Deer Valley Rd., Phoenix, AZ 85027.

☛ American Marine Institute, 3042 West International Speedway Blvd., Daytona Beach, FL 32124. Telephone (toll free): 1-800-874-0645.

General information about small-engine mechanic careers may be obtained from:

☛ Outdoor Power Equipment Institute, 341 South Patrick St., Alexandria, VA 22314.

For a list of public motorcycle, boat, and small-engine mechanic training programs, contact:

☛ SkillsUSA-VICA (Vocational Industry Clubs of America), P.O. Box 3000, 1401 James Monroe Hwy., Leesburg, VA 22075. Telephone (toll free): 1-800-321-VICA. Internet: <http://www.vica.org>

## Musical Instrument Repairers and Tuners

(O\*NET 85921A, 85921B, 85921C, and 85921D)

### Significant Points

- Almost two-thirds of all musical instrument repairers and tuners are self-employed.
- Opportunities should be excellent for persons with formal training in piano technology or brass, woodwind, string, and electronic musical instrument repair.
- Musical instrument repairers and tuners should be able to play the instruments on which they work.

### Nature of the Work

Musical instruments provide entertainment and recreation to millions of people everyday. Those who repair and tune instruments combine their love of music with a highly skilled craft to make sure that the next note played is as true as the last. Musical instrument repairers and tuners, often referred to as technicians, work in four specialties: Band instruments, pianos and organs, violins, and guitars. (Repairers and tuners who work on electronic organs are discussed in the *Handbook* statement on electronic home entertainment equipment repairers.)

*Band instrument repairers* work on woodwind, brass, reed, and percussion instruments damaged through deterioration or accident. Starting with the customer's description of the problem, they examine instruments and determine what must be done to restore them to proper performance levels and established industry specifications. These technicians also regularly tune and adjust instruments.

*Brass and wind instrument repairers* clean, adjust, and repair trumpets, cornets, french horns, trombones, tubas, clarinets, flutes,

saxophones, oboes, and bassoons. They move mechanical parts or play scales to find defects. They may unscrew and remove rod pins, keys, and pistons and remove soldered parts using gas torches. They repair dents in metal instruments using mallets or burnishing tools. They fill cracks in wood instruments by inserting pinning wire and covering it with filler. Repairers also inspect instrument keys and replace worn pads and corks.

*Percussion instrument repairers* work on drums, cymbals, and xylophones. To repair a drum, technicians remove tension rods by hand or by using a drum key. They cut new drumheads from animal skin, stretch the skin over the rimhoops, and tuck the skin under the hoop using hand tools. To prevent a crack from advancing in a cymbal, gong, or similar instrument, repairers may drill holes at the inside edge of the crack; another technique involves cutting out sections around the cracks using shears or grinding wheels. Percussion repairers also replace the bars and wheels of xylophones.

*Piano and organ repairers and tuners* locate and correct an assortment of problems associated with thousands of instrument parts made from wood, steel, iron, brass, ivory, felt, and sometimes Teflon. While the piano and organ are each over 300 years old, the basic engineering of today's piano and organ was done almost 100 years ago and the methodology has changed very little since.

To diagnose problems, *piano repairers* talk with customers and examine the parts of the piano. Depending on the severity of the problem, they may replace worn parts, recondition usable parts, or completely rebuild pianos. In some cases, they may reconfigure or



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redesign parts to solve a specific problem. For work such as regulating, repining, and restringing, repairers use common hand tools as well as specialty tools. In addition to repair work, piano repairers may also tune pianos.

*Piano tuners* increase and decrease the tension of piano strings to tune pianos to the proper pitch. A string's pitch is the frequency at which it vibrates, and produces sound, when it is struck by one of the piano's hammers. Pianos are tuned with the aid of either an electric or an acoustic pitch reference. The tuner strikes a key and compares the reference strings' pitch with that of the pitch reference. A tuning hammer (also called a tuning lever) is used to turn a tuning pin to increase or decrease tension on the reference string until its pitch matches that of the pitch reference. The pitch of each of the other strings is set in relation to the reference string. Modern 88-key pianos have over 200 strings and can be tuned in 1 to 2 hours, depending on the condition of the piano and the skill of the repairer.

Generally, piano technicians tune, repair, and rebuild pianos. Some piano technicians provide additional service for pianos with built-in humidity control devices, recording devices, and automatic player-piano devices. These specialty services and repairs require additional training, yet are still considered part of the technician's duties.

*Pipe-organ repairers and tuners* tune, repair, and install organs that make music by forcing air through flue pipes or reed pipes. The flue pipe sounds when a current of air strikes a metal lip in the side of the pipe. The reed pipe sounds when a current of air vibrates a brass reed inside the pipe.

Pipe-organ repairers locate problems, repair or replace worn parts, and clean pipes. Repairers also assemble organs on site in churches and auditoriums following manufacturer's blueprints. They use hand and power tools to install and connect the air chest, blowers, air ducts, pipes, and other components. They may work in teams or with the assistance of helpers. Depending on the size of the organ, an installation job may take several weeks or even months.

To tune an organ, repairers first match the pitch of the "A" pipes with that of a tuning fork. The pitch of other pipes is set by comparing it to that of the "A" pipes. To tune a flue pipe, repairers move the metal slide that increases or decreases the pipe's "speaking length." To tune a reed pipe, the tuner alters the length of the brass reed. Most organs have hundreds of pipes, so often a day or more is needed to completely tune an organ.

*Violin repairers* adjust and repair bowed instruments, such as violins, violas, and cellos, using a variety of hand tools. They find defects by inspecting and playing instruments. They replace or repair cracked or broken sections and damaged parts. They also restring instruments and repair damage to the finish of the instruments.

*Guitar repairers* inspect and play the instrument to determine defects. They replace levels using hand tools, and replace or repair damaged wood or metal parts. They reassemble and string guitars.

### Working Conditions

Although they may suffer small cuts and bruises, the work of musical instrument repairers and tuners is relatively safe. Most brass, woodwind, percussion, and string instrument repairers work in repair shops or music stores. Piano and organ repairers and tuners usually work on instruments in homes, schools, colleges and universities, and churches, and may spend several hours a day driving to appointments. Salaried repairers and tuners work out of a shop or store; the self-employed generally work out of their homes.

Recently, musical instrument repairers have switched to using non-toxic chemicals to clean, fill, and mold instruments, instead of the traditional sodium cyanide and chromate solutions. These changes have made workplaces cleaner and safer.

### Employment

Musical instrument repairers and tuners held about 13,000 jobs in 1998. Most technicians worked on pianos. About two-thirds were

self-employed. About 8 of 10 wage and salary repairers and tuners worked in music stores, and most of the rest worked in repair shops or for musical instrument manufacturers.

### Training, Other Qualifications, and Advancement

For musical instrument repairer and tuner jobs, employers prefer people with post high school training in music repair technology. According to a 1997 Piano Technicians Guild membership survey, more than 85 percent of respondents had completed at least some college work; at least 50 percent had a bachelor's degree or higher.

Some musical instrument repairers and tuners learn their trade on the job as apprentices or assistants, but employers willing to provide on-the-job training are difficult to find. A few music stores, large repair shops, and self-employed repairers and tuners hire inexperienced individuals as trainees to learn how to tune and repair instruments under the supervision of experienced workers. Trainees may sell instruments, clean up, or do other routine work. Usually 2 to 5 years of training and practice are needed to become fully qualified.

A small number of technical schools and colleges offer courses in piano technology or brass, woodwind, string, and electronic musical instrument repair. A few music repair schools offer 1- or 2-year courses. There are also home-study (correspondence school) courses in piano technology. Graduates of these courses generally refine their skills by working with an experienced tuner or technician.

Music courses help develop the student's ear for tonal quality. The ability to play an instrument is helpful. Knowledge of woodworking is useful for repairing instruments made of wood.

Repairers and tuners need good hearing, mechanical aptitude, and manual dexterity. For those dealing directly with customers, a neat appearance and a pleasant, cooperative manner are important.

Musical instrument repairers keep up with developments in their fields by studying trade magazines and manufacturers' service manuals. The Piano Technicians Guild helps its members improve their skills through training conducted at local chapter meetings and at regional, national, and international seminars. Guild members can also take a series of tests, one written and two practical, to earn the title Registered Piano Technician. The National Association of Professional Band Instrument Repair Technicians offers similar programs, scholarships, and a trade publication. Its members specialize in the repair of woodwind, brass, string and percussion instruments. Repairers and technicians who work for large dealers, repair shops, or manufacturers can advance to supervisory positions or go into business for themselves.

### Job Outlook

Musical instrument repairer and tuner jobs are expected to increase more slowly than the average for all occupations through the year 2008. Replacement needs will provide the most job opportunities as many repairers and tuners near retirement age. The small number of openings, due to both growth and replacement needs, is very low relative to other occupations. Because training is difficult to receive—there are only a few schools that offer training programs and few experienced workers are willing to take on apprentices—opportunities should be excellent for those who do receive training.

Several factors are expected to influence the demand for musical instrument repairers and tuners. The number of people employed as musicians will increase, mainly due to a slight increase in the number of students of all ages playing musical instruments. Because instruments are quite expensive to purchase, growing numbers of instrument repairers will be needed to work on rental equipment leased to students, schools, and other organizations.

### Earnings

Median annual earnings of musical instrument repairers and tuners were \$23,010 in 1998. The middle 50 percent earned between \$17,780

and \$29,500 a year. The lowest 10 percent earned less than \$13,230 and the highest 10 percent earned more than \$38,680 a year. Earnings were generally higher in urban areas.

### **Related Occupations**

Musical instrument repairers need mechanical aptitude and good manual dexterity. Electronic home entertainment equipment repairers, vending machine servicers and repairers, home appliance and power tool repairers, and computer and office machine repairers all require similar talents.

### **Sources of Additional Information**

Details about job opportunities may be available from local music instrument dealers and repair shops.

For general information about piano technicians and a list of schools offering courses in piano technology, write to:

✉ Piano Technicians Guild, 3930 Washington St., Kansas City, MO 64111-2963. Internet: **<http://www.ptg.org>**

For general information on musical instrument repair, write to:

✉ National Association of Professional Band Instrument Repair Technicians (NAPBIRT), P.O. Box 51, Normal, IL 61761.